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# DEEP BREATHING,

AS A MEANS OF PROMOTING THE ART OF SONG, AND OF  
CURING WEAKNESSES AND AFFECTIONS OF THE  
THROAT AND LUNGS, ESPECIALLY  
CONSUMPTION.

BY  
SOPHIA MARQUISE A. CICCOLINA.

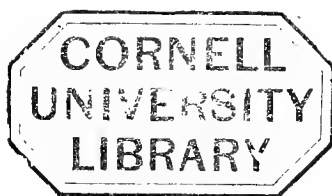
*ILLUSTRATED.*

TRANSLATED FROM THE GERMAN BY  
EDGAR S. WERNER.

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## P R E F A C E .

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THE following pages on Deep Breathing seem to me too valuable not to be preserved in permanent form. They were originally translated by Mr. E. S. Werner for the admirable paper which he publishes, entitled *The Voice*, and, after having done good service in that journal, he has kindly consented to have them appear in this form for still more extended usefulness. It may not be out of place if I say a few words in this preface on the relations of the atmosphere to life, which will serve to enforce the value of the practice of deep breathing. Where respiration is full and vigorous, as for instance in most birds, life is energetic. Where it is feeble, as in snakes and frogs, life is torpid. Man lives in proportion as he breathes, and the activity of the child is in close relation to the strength of its lungs ; so, too, is the calmness, dignity and power of man in proportion to the depth and tranquillity of his respiration. If the lungs are strong and active, there is courage and boldness. If feeble, there is cowardice and debility. To be out of spirits is to be out of breath. To be animated and joyous is to be full of breath. When eager and full of enterprise, we consume large quantities of air ; when weary, we yawn ; when frightened, we are breathless and aghast. However well we feed ourselves, if we do not breathe enough, we do not take on good conditions, but become feverish and irritable.

Deep breathing, then, helps us to more perfect and complete living. It is so simple and easy a matter that every one can practice it.

The enthusiasm of the author of these pages is so great that she carries her readers with her. In a leading sanitarium, a class in deep breathing was formed soon after reading one of the chapters of this book, and the inmates rose early and practiced it for an hour before breakfast. One young lady invalid increased the size of her chest in a few weeks three inches, and her health more than the size of her lungs. Others were also greatly benefited. That the same benefit will be extended to thousands there can be no doubt.

I have added in an appendix, in a very condensed form, a few facts concerning the atmosphere, for which I make no apology.

M. L. H.



# DEEP BREATHING,

AS A MEANS OF PROMOTING THE ART OF SONG AND  
OF CURING VARIOUS DISEASES, ESPECIALLY CON-  
SUMPTION.

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## PART I.

*Motto* : As the lungs of themselves do not fully perform their function, and, consequently, are not sufficiently exercised and kept at the height of their energy, they lose their elasticity and are restrained in their plastic processes. As a result, various diseases originate in the lungs and in other parts of the body affected by the condition of the lungs. Above all consumption results.—  
Dr. FR. BICKING.

IN 1877 I published, in the Dutch language,\* my investigations regarding deep breathing. Since then I have been asked very many times what induced me to write on a subject so far outside woman's customary sphere of thought. This very natural question I will answer at once. Gifted with more than ordinary talent for singing, I improved the first opportunity of cultivating my voice. I took lessons of the first teacher at a celebrated conservatory. My progress was surprising. In the first seven months I sang the dramatic arias of the operas "The Muette of Portici," "The Jewess," "Robert le Diable," "Ferdinand Cortez," and others. After eight months' study I had lost my voice, or rather was

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\* *De diepe Ademhaling, hare verhouding tot de Gezondheid en de Zangkunst.* Amsterdam, Firma Meyer, 1877.

unable to use it for singing. Pain in my throat and chest, and an indescribable feeling of fatigue, were the deplorable results of every new attempt I made to continue my studies. I well remember the painful sensations I then experienced, especially the impression that an internal trouble had arisen. I struggled along in this way for nearly three years. I consulted various physicians and followed their advice ; devoted myself to the care of my health ; went to the first artists and sang under their direction, but the same difficulties always met me : the breaking of the tone which brought me to despair, and the already mentioned physical disorders which compelled me to let my voice rest,—a fruitless forbearance, for every renewed attempt to sing was sure to bring back the old troubles.

My condition was pitiable. I was possessed of a powerful, resonant voice of a compass of two octaves and a half, and yet could not sing ! Convinced that the cause was a wrong use of the tone-producing organs, I consulted some of the most celebrated singing-teachers of Paris, but was always met with,—“ Rest ; don’t sing for awhile ! ”

I leave it for my readers to judge of the effect this advice had upon me, after I had been resting and refraining from singing for three years ! Yet my courage did not fail me. I said to myself : “ Seek, and thou shalt find.” I sought and I found. My good star led me to Wartel, in whose school Trebelli, Nilsson, Marie Roze, Monthelli, and many other singers have had their voices trained. After two months’ study Wartel informed me that a year’s study with him would fit me for an artistic career. This was not my intention ; I only wished to sing at any time, to be able to use the gift nature had bestowed upon me, for my own and others’ pleasure ; and that this became

my good fortune I have to thank a three months' course, with almost daily instruction, with the great master, Wartel.

I could sing again !

Do you know, dear reader, what it is to sing or not to be able to sing ? According to a saying of one of our Hollandic authors, Mina Krüsemann, "To sing or not to sing," is almost to be compared to Shakespeare's "To be or not to be." "Singing is life," she writes. Yes, only he who has sung knows how joyous life is made by song, for ourselves and for others.

Now, what did Wartel do to restore my voice ? At my first visit he said to me :

"You rest, madame ; that is ridiculous ! Nature has not endowed you with so beautiful an organ to have it kept asleep. It is necessary to sing, but to sing well, under the direction of a master, not of an executioner !"

This will sound severe to him who has injured many voices besides mine. He is not the only one who, without general knowledge of the human organism or special knowledge of the vocal organs, systematically ruins the voices whose training is intrusted to him ; not to mention the innumerable teachers who, although they do not really spoil their pupils' voices, are not qualified to give them the highest possible development. I would thunder this in the ears of directors of conservatories, and of others, who engage as singing-teachers men who, although physically robust, are unable to bear the fatigues of an artistic song-career, thereby proving that they sing by a bad method, for singing is conducive to health, and is beneficial to weak as well as to healthy and strong persons.

Stephen de la Madeleine, the distinguished and conscientious singing-teacher of Paris, relates the case of a

consumptive young girl whose health he not only restored by judicious singing lessons, but also developed in her a comparatively good voice—something she did not possess before.

Whoever cannot endure singing, sings badly—bad in so far that his singing is artificial, not natural ; that is, he does not employ the splendid means nature has placed at his disposal. In this condition I found myself when I went to Wartel for instruction. To whom I owed the good luck of being able to use my voice naturally again, and to whom I shall ever be thankful, I knew on leaving Wartel. The means of my restoration remained a secret to me.

Wartel, who was then about 70 years old, and who still often delighted his pupils with his full, rich voice, had a very mysterious and ingenious method which, as he said, was taken from the old Italian masters. He had us sing certain exercises with closed mouth, in order to bring us unconsciously to the end he had in view, viz.: to attack every tone in one and the same place and to employ deep, abdominal breathing.

An illustration of the excellence of this method may be given here. In 1876, Daniel de Lange, teacher in an Amsterdam school of music, called on me and desired some hints on the management of the singing voice, of which he said he knew nothing for a certainty. “There are,” he explained, “so many young voices intrusted to me, that I have only undertaken their training with a feeling of anxiety, realizing how slight a mistake can ruin them forever.”

“Mere hints, dear sir,” I replied, “will be of little use to you ; you ought to sing with me, for, in order to teach singing, one must, at least, first learn to sing.”

“But I have no voice.”

"As you talk to me, I am convinced of the contrary."

"Yes, but my voice is very disagreeable, even false; forced, it seems to me, in my youth."

"That is of little consequence. Where there is no defect in hearing—as can be presupposed to be the case with such an excellent musician and distinguished violoncellist as you—the falsest voice can be restored and cultivated. Dissonance usually results from not being able to control the vocal organs, from forcing or wrongly using them."

"But I am very busy. My lessons in music, the direction of various singing societies both in and out of the city, leave me no time for studying singing."

"I am also very much occupied; am engaged in studies, and am about to publish a book on the progress of singing, a subject of deep interest to both of us. You devote a couple of hours a week to this object, and I will also do so with the greatest pleasure."

We began. He certainly did have a disagreeable, nasal, hollow and trembling voice which could not produce pure tone even in a compass of three or four notes. Soon the disagreeable, nasal and false tones disappeared. His voice increased in compass, resonance and power as he more and more gave it the inner support of a compressed and firmly held air-column, which is furnished only by voluntary deep breathing. He soon taught my method, with happy results. He also soon criticised, as reviewer of a much-read and valued journal (*Het Nieuws van den Dag*), the different, mostly bad, types of breathing of artists; but unfortunately, without giving them a remedy, as he forgot to call attention to my school of breathing.

After this digression I will observe that the deep breathing, to which we were unknowingly habituated by Wartel, and which I found out only years afterward, is

not alone the basis of a healthy, powerful voice-development, but also the surest foundation of respiratory gymnastics which have been recommended for years.

The great art of singing does not, indeed, consist in merely inhaling a large quantity of air, but almost wholly in retaining the air, in controlling the expiratory muscles, which instinctively perform their work if we, voluntarily or involuntarily, do not hinder them. The voluntary and long retention of air is far more difficult to accomplish and requires far more practice than actual deep inhalation. This was certainly the reason why the wise men of antiquity, who used respiratory gymnastics as a means of restoring and promoting health, so strongly advised holding air in the lungs.\* The retention of air is an art needful to every singer. For the sake of song it is, therefore, to be deeply regretted that the daily breathing exercises of the ancients should have fallen into oblivion.

By practicing deep inhalation and holding the air, I recovered, some years afterward, from a sickness which my physician called "a nervous asthmatic affection of the respiratory organs." I have had the happiness of relieving a number of asthmatic persons, by the use of these respiratory gymnastics; to greatly ameliorate the condition of consumptives and of those who expectorated blood, by the so salutary practice of deep breathing, which requires not the slightest strain on the part of the invalid; to cure completely a man twenty years old, who had suffered from his seventh year with a severe form of asthma,

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\* A deep breath widens the air-cells in the lungs, increases the activity and strengthens the elasticity of their tissue, while the cellular and fatty tissue in the interstices is removed. On the other hand, a restraining of the respiratory function and of the pulmonary vesicles causes the lungs to become smaller and their tissue to grow thicker,—*Die Gymnastik des Athmens*, by Dr. Bicking, p. 10.

by singing exercises, joined, of course, to continual retention of air ; and, finally, to see changed to a healthy and robust condition an aged and blind man of Amsterdam who for seven years had languished there in consequence of great debility and impoverished blood, by deep breathing and retention of air out-of-doors. In short, I have had the good fortune to learn to prize the worth of deep breathing for the preservation of health and life.

Should I keep all this to myself ? Should I withhold from all mankind this great secret of art known only to a few singing-teachers and artists ? No ! The recollection of the pain I had suffered on account of losing my voice lived too fresh in my heart. Vividly appeared before my mental vision the hundreds, yes, the thousands, perhaps, who, similarly afflicted, were thus robbed of a happy existence, of a brilliant career, and I resolved to do all I could to spare them from this melancholy fate, and to strive with all my power to restore the old Italian school of singing in all its purity and grandeur.

I turned first to physicians, that through their influence I might gain entrance to hospitals, asylums for the blind, and other charitable institutions. I succeeded in imparting my ideas to directors, superintendents, singing-teachers, physicians of hospitals and asylums, and in teaching them deep breathing. All of our physiologists, with whom I conversed, were greatly interested in the subject, and encouraged me to continue my investigations. But I failed in what I most desired ; none of our scientists would take up the pen for the good cause that lay so near my heart. The most friendly of them—and among such I thankfully name Prof. G. J. Mulder and Prof. Stokis, of Amsterdam, and Dr. Swaving, of Arnheim, (Holland)—advised me to write. “ We must make a virtue of neces-

sity." Failing to procure another's pen, I determined to use my own.

But to write on so difficult a subject, I had to study more; to renew my inquiries in various directions. I now give the result of my investigations, and would address especially that part of humanity which suffers the most—woman, she who falls the first victim of so many prevailing false notions regarding education, propriety, clothing, etc.; she—unfortunately, I must confess it—who is the joint cause of the listless, enervated, stunted condition frequently seen in the present generation, and especially in the better classes.

Nature gives us nothing without an object. This is shown by the ancients' unremitting search for the use of the spleen. The smallest part of our body has its purpose and contributes to the welfare of the entire organism. We have our eyes and ears, hands and feet, to use in their full development; and who of us would be so irrational as to teach his child to go through life with half-covered eye, with half-stopped ear, or with closed hand? "No one," I hear in reply; "no one!" The Chinese, indeed, cripple the feet of their women; they cramp their soles as much as possible—the very parts that must bear the body through life with ease and grace! My dear reader, the Chinese may not know any better, yet they are much wiser than we Europeans. They violate the laws of nature much less than we do. A person can be healthy with three-fourths or one-half a foot, or, indeed, without any foot at all. Without lungs life is not possible even a moment; and by our forcing one-half or three-fourths of our lungs to remain inactive—as most of us in the upper classes do—we give ourselves and our children an enervated, sickly organism; and we women develop the germs of the many diseases which have become a disgrace



to humanity, and among which stands preëminently consumption, which statistics say is the cause of twenty per cent. of the deaths. For nature gives us nothing in vain, nothing without a very useful purpose. "She is right every time," says Goethe, "and particularly where we least understand her." She gave us so many lung-cells that if spread out they would cover 14,000 square feet. These were not given us for an ornament, but because they are absolutely necessary for the preservation of health and the maintenance of life. They are essential for the reception of oxygen and the expulsion of carbonic acid, which is the function of the respiratory process.

"She cannot do otherwise than do right eternally," observes the divinely-endowed poet further, "unconcerned as to what the results may be."

Yes, heedless of the consequences, she goes along attaching inevitable effects to causes and calmly looks on, for centuries and centuries, while everything seems progressive, while human knowledge of natural laws widens, while the human organism becomes weaker and more languid, and begins life burdened with more and more disease-germs, puzzling scientists, who are kept busy inventing new names for the vocabulary of abnormal human affections. Could we look into this vocabulary we would shrink in terror from the awful number of ills to which we are exposed. We laymen would also be more careful how we speak disparagingly of the knowledge and skill of our physicians. The superficial assertion is not infrequently heard, "Pshaw! doctors don't know it either." There is much, gracious reader, that the physician does not know, but he knows a thousandfold more than we, and particularly that which he wisely withholds from us, viz.: That it is often difficult, almost impossible, to check the devastating development of germs, which we not sel-

dom have had within us and have nourished many years, and to bring the body to a healthful condition. The physician is constantly confronted by problems presented to him by natural symptoms whose causes he must ascertain. We should be willing to aid him in this difficult task, for we best know our own physical and mental state. But, above all, we should not be deaf to his advice, the observance of which often will spare us dangerous diseases. For is it not true that we women, in spite of his repeated warnings and in defiance of well-known natural laws, following fashion slavishly, cramp and deform our lungs and chest, thereby impeding the respiratory process and giving our bodies an unnatural shape, suited to the wasp but not to human beings? And yet we inconsistently ridicule the Chinese,—discovering the mote in our brother's eye while we are blind to the beam in our own eye!

How often have I heard invalids say: "We must be to our parents a constant cause for self-reproach and accusation, for we have them to thank for our miserable body, which we, coughing and panting, must drag through life!" And, unfortunately, it is so. Were not physicians the most considerate and sympathetic of persons, how often would our ears be shocked by unwelcome, galling truths,—how often would we be obliged to hear at the bedside of our sick children, surrounded by sobbing mothers, these or similar words: "You have given your children this wretched organism. Your folly has brought them so young to the brink of the grave. Your mania for tight-lacing and your aversion to fresh air have kept nature from exerting her salutary influence upon the bodies of your children. You have burdened them with this infirm body, with which they in turn will bear children who likewise will be puny and sickly. Even the poor, ill-nourished laboring woman produces healthy

offspring, which you might have did you obey nature's laws."

Oh, that the many warnings, oral and written, of physiologists and hygienists were heeded more, especially when they refer to the change of gases in our lungs! What must we do here—what terrible sacrifices of money and time must we make? Nothing to do except to give our lungs room, and admit air freely to them. We merely have to stop compressing our lungs into the smallest space, thereby preventing millions of air-cells from performing their functions. We should watch not only the muscles of our arms and legs, but also those of inhalation and exhalation; we should not only not impede their natural action, but exercise them voluntarily, as we do the muscles of our hands and feet in the gymnasium, that they subsequently may move automatically to the good of our health.

"Breath," writes Dr. von der Deeken\* (and Dr. Neumann pronounces these statements as true as any that have been made in the domain of the natural sciences),—"breath is an actual vivifying act; and the need of breath, as felt, is a real life-hunger and a proof that without the continual charging of the blood-column with the proper force all the other vital organs would soon stagnate and cease action altogether."

The reply may be made: "Why, we always breathe; indeed, we could not live without breathing." It is true that we breathe involuntarily, passively, but we should breathe voluntarily, actively; for, as Professor Lehweß† writes, "full inhalation does not take place wholly without our volition." We ought to breathe voluntarily,

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\* *Graefenburger Mittheilungen*, Heft 1, p. 7.

† *Die Heilung des Stotterns*, Braunschweig: Vieweg & Son, 1868.

forcibly, often ; and to be able to do this without fatiguing in the least the most delicate and sickly constitution, we should take deep breaths and teach them to our families and friends. We should so strive that a new century will not find a civilized, cultured, yes, a very learned people unable to voluntarily, either for the purposes of nature or of art, perform the first and most indispensable function of life. According to my firm belief, this is the most effectual means offered us of destroying the innumerable, terrible disease-germs—especially the germ of consumption—which have accumulated in us as the result of our perverted, unnatural manner of life. In using this remedy we simply listen to nature, who constantly urges us to take in breath ; we imitate her when she uses fever—*i. e.*, an increased functional activity, an accelerating of the respiratory process—to drive the seeds of disease from our bodies ; we aid her, we anticipate her and pluck the fruit which ripens for mankind on the tree of knowledge of natural, deep breathing.

## PART II.

*Motto* : Inspired air receives its first virtue through the *gymnastic* of breathing. What is the use to send invalids to a healthy region if they do not breathe its air deep into their lungs ? Air of itself does not expand the lungs ; their mechanical expansion is more salutary than the advantages of so-called healthy regions.  
—Dr. FR. BICKING.

“WHO goes slow, goes sure,” were the words with which I began, in the previously-mentioned book, to give the result of my inquiries into deep breathing,—its effect upon health and the art of song. In this, also, nature sets us the example. Slowly and surely she develops every seed and every grain of sand. Slowly and surely

she forms in us the almost unnoticeable microscopic germs which frequently break out before our astonished eyes in devastating diseases. Slowly and surely she allows us to glance into her treasure-store that our information may be founded upon fact,—to dive into experience from which issues, likewise slowly and surely, knowledge, the mother of wisdom.

In like manner man erects the structure of science. Very slowly and surely rises that proud temple, whose top already towers high, although many a stone is wanting to perfect it. Glad must be he who is able to contribute even a grain of sand toward its construction. This was my happy lot on communicating my experience with the art of breathing and of song to a number of Hollandic physiologists, who always encouraged and instructed me, and finally induced me to publish the results of my investigations.

*Up to the present time, voluntary deep breathing is not discussed or mentioned in any physiological work!*

Although recognized and recommended to the attention of physiologists by our leading periodicals, my book has not accomplished its purpose. Why? Very probably because I, in attempting to reveal a melancholy truth with the greatest delicacy, gave too much prominence to the art of song. In view of the deplorable scarcity of physicians, the result of the new statutes, how could a doctor, who is confronted by so many vital questions, be expected to give special attention to vocal culture? Has he not too much on his hands already? This is shown by the petition recently addressed to the Dutch government and signed by forty-nine physicians. What interest, then, can a Hollandic doctor take in the flourishing of a luxurious art? Why should he care if, in distant countries, many excellent voices are ruined by a bad

method of breathing, if out of the true fountain of life, health and happiness in the voluntary promotion of change of organic substance, many singers drink sickness, despair, and even death?

Did not the art of song find the requisite protection, on the part of physiologists, in Oribasius, Cælius Aurelius, Plutarch, Mercurialis, Aristoteles, and Galen? Did they not recommend singing as conducive to health, and as a remedy for various diseases? Have not our contemporary scientists—Drs. Segond, Bennati, Debay, Colombat de l'Iserè, Cruveilhier, and others—written on this subject? Has not Dr. Mandl, physician to the Paris Conservatory, in conjunction with MM. Flourens and Magendi, declared that the bad condition of the voices of most French singers, after one or two years' instruction, was wholly due to the manner of breathing taught at the Conservatory? Did they not add, that of the various modes of breathing—clavicular, costal, and abdominal—only the last named should be recommended as practicable, correct, and advantageous to health and voice? Is not this also the view of Dr. Lennox Browne, surgeon to Her Majesty's Italian Opera in London, who, in a recent lecture before a large scientific society, demonstrated that singers' injured voices were the fruit of wrong breathing, and that the secret of proper cultivation and preservation of the voice was lost with the old Italian school, whose masters did their utmost to develop deep breathing—abdominal breathing, which seemed to him the only respiratory method to advise?

All this is only too true, and it would be ingratitude on our part if we did not acknowledge the debt we owe to these and many other physiologists for their efforts in behalf of the art of song. Not less true is it, as Dr. Browne further observed, that the cultivation and preservation of

the human voice should be under the guidance of a physiologist, of a physician. The opinion of this distinguished man is the same that I expressed to our physiologists, when I besought them to take up their pen for the good cause. But they advised me to do it myself. In view of these facts it is less surprising that I at once devoted myself assiduously to the study of the human respiratory organs, and wrote a book, in which I tried to prove to scientists that, if the decline of the art of song was due to the manner of breathing, *this abnormal respiratory method was the fault of physiologists*, for they have discussed all the various modes (even the worst) of breathing, except the only right one—*abdominal!*

This neglect is the more to be wondered at, and the more to be deplored, when the consequences are considered. Centuries and centuries have passed since respiratory gymnastics were recommended as a means to restore and preserve health. Dr. Neumann, in his valuable work,\* says: "The Chinese employed voluntary and ingeniously varied breath-taking as a remedy for many diseases. Likewise, the people of East India, 1300 years B. C., practiced breathing, holding the air in the lungs, etc., several times a day, for the purpose of cleansing all the organs of the body, especially those of the chest."

Cælius and Galen, and other Greek and Roman physicians, recommended deep breathing and retention of air—*cohibitio spiritus*—as a daily exercise and as a remedy. They believed thereby to increase the heat of the inner organism, to enlarge the chest, to strengthen the respiratory organs, to remove impurities from the breast, to open the pores of the skin, to thin the skin itself, and to drive fluids through.

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\* *Die Athmungskunst des Menschen.*

“In the Middle Ages,” writes Dr. Neumann, “the Greek and Roman physicians, as is shown by the writings of Mercurialis, Oribasius, and others, knew the use of respiratory gymnastics in the treatment of diseases only theoretically, but did not employ them in their practice; certainly they did not improve upon them.” Yet we read in the writings of Oribasius very interesting remarks on the influence of singing upon the course of various diseases. Singing was used not only to prevent but to cure affections of the lungs and of the digestive organs. Plutarch asserts that the exercise of the voice does much to promote health, and Cælius Aurelius prescribed singing as a remedy for headache, catarrh and insanity.

Now, what is singing but exercise, especially of the respiratory apparatus? Does it not consist in a constant change of a large quantity of air which we first voluntarily retain in order to expel it again with all possible force? Does it not consist in an actual renewal of the air within us? It is the employment of the different breath-movements used as a remedy by the Chinese, as religious exercises by the people of India, as a health-preservative by the Greeks and Romans, and for the same purpose by Oribasius in the Middle Ages. Singing is, therefore, a breath and lung-gymnastic, recommended centuries ago, but which, unfortunately, since then has been little known in theory or practice.

Many great singers have appeared on the artistic horizon; much has been written upon the art of singing; gymnasts, whose chief aim is to strengthen, by the voluntary exercise of all the muscles, the body, and especially the lungs, have sought to impart their knowledge for the good of mankind—yet in spite of all this, their efforts have mainly failed because of the neglect of separate, voluntary, deep-breathing exercises. They were wrecked



on the ignorance which still exists in regard to the human respiratory functions. The lung-gymnastics of thousands of years ago subsequently fell into disuse, and in our day are, unfortunately, known only by name.

What has been the cause of this melancholy state of affairs? Has science—the knowledge of nature and of her laws—made such giant strides forward in the last decades that we have been induced to overlook the value of good air, the first and best means offered by nature for allaying our life-hunger? Have scientists failed to acquaint us with its virtue? Do they stand mute and motionless, perceiving unconcerned how humanity comes into existence in individuals always weaker, punier, and less and less fit for life's duties? Do they behold how impoverished blood, scurvy, nervousness, and that terrible plague, consumption, are devastating more and more all classes of society, sparing neither wealth nor youth? Do they see all this without warning us, without teaching us, without imparting to us their knowledge?

No! Numberless books prove the contrary. The physician, the ever-sympathizing, true friend of suffering humanity, does not stop with using all the remedies known to him. He searches unremittingly in that labyrinth called the human body, in which he is able to obtain actual insight only when the spirit has departed and all the life-functions have ceased. He investigates restlessly, and communicates whatever can be of service to us. How many books can be found which have the same origin and aim—to direct us laymen to the inexorable laws of nature, who so often punishes slight offenses with the severest, most deplorable consequences.

Beside those already named, I would mention Dr. Bock, the renowned champion of the general dissemination of approved remedies and sanitary measures, and

the indefatigable opponent of secret nostrums, who in his multitudinous writings continually advises "powerful inspirations and expirations in the purest air." Cruveilhier, in his "*Mouvements de Tetanos*" ["Tetanic Movements"], recommends deep breathing not only as a health-remedy, but also as a cure for muscular convulsions, especially tonic spasms. Prof. Lehwiss, speech-physician of Berlin, in his "*Heilung des Stotterns*" ["Cure of Stuttering"], expresses the same opinion, and bases his method for the cure of stuttering mainly upon respiratory and vocal exercises. He says: "Thereby we work upon enervated muscles and their functions, bring them into permanent activity, and make them obedient to our will. Thus, not only will the respiratory system be enlarged and quickened, and the lungs strengthened, but the blood's circulation promoted and the injurious influence overcome which often takes away the stutterer's courage for speaking and puts his very soul in chains."

Notwithstanding the great excellence of his book, Prof. Lehwiss describes as little as do Dr. Bock and others, natural, deep breathing. How many medical and scientific books are translated into other languages! In this connection I can mention in one breath two eminent, learned philanthropists, without being able to decide which one deserves the greater admiration—either the celebrated and talented Dr. Niemeyer, of Leipzig, who, in warning tones through all his writings, urges breathing gymnastics upon well and sick in words like these: "Prize air; use good, pure air; breathe fresh air in your room by night as well as by day." Or Dr. Sannes, of Rotterdam, who, in his translations of Dr. Niemeyer's works, fully agrees with his colleague, and sends forth his teachings like a powerful echo for the good of his fatherland and his countrymen.

To both of these gentlemen I owe boundless thanks, for by their prescribed cold-remedy—breathing exercises by open window, the fresh air (even in very cold weather) streaming into a warm room, at the beginning of the cold—I have cured, in one or two days, at various times, very dear friends who formerly were subject to long weary months of sickness as the result of colds. I must add that, following the advice of my physician, Dr. Swaving, of Arnheim, I did not have my patients stand at the window, but lying in bed secured from draft and too strong a current of air.

Dr. Dally, in his work, speaking of the purely chemical direction taken by medicine and the consequent disregard of organic and particularly respiratory treatment, writes: “There is, then, a vast chasm in medical art. We must attribute this neglect to the present ignorance of the remedial gymnastics of the ancients, and to the too great importance given to the accessory sciences in modern therapeutics, which too often are veritable chemical experiments.” Dr. Dally may rejoice at the progress made in this respect. We are indebted most to his great admirer and imitator, Dr. Neumann, who, in his voluminous book entitled “*Die Athmungskunst des Menschen*” [“The Art of Breathing of Man”], contributes not only grains of sand, as he modestly says, but blocks of stone to fill up the gaps indicated by Dr. Dally.

Dr. Neumann’s work has been a real guide to me in exploring the field of the human respiratory system. Doubtless, many of my lady readers would like to know how it led me to the discovery that physiological books, instead of describing natural, voluntary, deep breathing, only treat of an artificial enlargement of the thorax. The fulfilling of this desire would, unfortunately, tax their minds. I would have to lead them to regions not

willingly approached by delicate, womanly natures, to subjects they shrink from discussing, to vital questions upon which they do not care to think.

However, I write mainly for the welfare of woman. My own experience teaches me how difficult it is for us women, even with a great object in view, to hold ourselves to the consideration of that living wonder called the human body—to ascertain how this cause produces that effect ; how this muscle supports that muscle ; notwithstanding that this negligence may be the means of our overlooking how certain muscles, which we are wrongly using and overtaxing by our artificial mode of living, are disturbing the natural functions of other muscles ; and also the means of our misunderstanding entirely the “speech of nature,” “because it,” as Schopenhauer says, “is so very simple.” We thus impose hard, unnecessary burdens upon our bodies, as is the case in voluntary costal breathing.

Fortunately, we women do not require so great and comprehensive knowledge of nature in order to be healthy and energetic, to be useful to ourselves and to others. We do not need to pile superfluous, scientific burdens on our delicate bodies, already exposed to so many cares and sorrows, before we can avail ourselves of the blessings so freely and abundantly offered us by nature. All we have to do is to avoid those perils which are bringing our sex—yes, all civilized humanity—to the brink of a terrible abyss breathing forth sorrow and pain. We must no longer despise and reject the first and chief vital nourishment. We must learn to practically develop those parts of our body which are designed to receive it and to convert it into natural bodily nutrition. As many scientists of this and former times have advised, we must learn to inhale air, much air ; not according to the man-

ner described in physiological books, which, in the words of Dr. Neumann, "is very difficult to perform, and requires great and repeated efforts, and which only expands the sides of the lungs, leaving the lower parts unfilled, so that on taking a powerful inspiration a painful pressure is experienced ;" not in this manner, which would be impossible for our invalids, and practicable only for very powerful men, but in a way better adapted to our fine, delicate constitutions—a manner of breathing that shall expand the lungs and chest more in their length than in their breadth, and which shall be easy and unfatiguing. Upon this basis lung-gymnastics, recommended so long in vain, will receive due recognition, and through them will be opened a fountain of health for humanity ; a fountain always with us—one which scientists have known and recommended for centuries, but yet have failed to discover the easiest and most practical way to draw therefrom.

Just because it is so simple must a simple woman disclose the secret from the ruins of a life replete with bitter experiences ! Yes, in the true sense of the word deep breathing is simple—in proportion far simpler than the mentioned rib-breathing is complicated, difficult and tiresome. It is found as an instinctive natural movement in new-born infants. Valentin reports this as a very significant discovery of Drs. Beau and Maissat. Other physiologists have observed it in children up to the fourth and fifth year, while Dr. Kerbert has found it recently in children eight years old.

The belief seems to be that abdominal breathing in its full normal condition does not exist in more advanced age, for in medical works it is given as the result of coughing, sneezing, attacks of asthma, etc. "Later," says Valentin's "*Human Physiology*," "man breathes with the

lower, woman with the upper ribs." This may be so, unfortunately, but certainly not because nature wishes it. No, but because we, in consequence of false education, begun in childhood and which extends its baneful influence all through life, check the activity of the respiratory muscles and thereby favor whatever predisposition to pulmonary disease there may be, particularly lung-tubercles (too short inspirations and retentions of air).

Girls, especially, are apt to restrict prematurely, I may almost say willfully, free bodily movements. Lacing, much sitting and hard study in school, fancy work at home,—all these tend to prevent free, deep breathing. The muscles lose their activity while we develop our children into art-products.

What wonder, then, that physiologists find no other mode of breathing than that which expands the upper ribs in woman and the lower ribs in man, when this is the only movement possible, because these are the only muscles that hitherto have been called into play in respiration. Neither is it surprising that the patient, at the request of the doctor to breathe deep, usually breathes only *high* or attempts to enlarge his chest in an abnormal manner.

What wonder, then, that I, during the many years I wrestled with this vital question, met only *three* physiologists who employed deep breathing, and who considered it so simple and natural that they gazed at me in astonishment when I named many of their colleagues who were not so well informed in this respect, who were able to employ only voluntary costal breathing as described by Valentin, who thankfully received instruction from me in deep breathing, and promised to teach it to other physicians, to their patients and scholars.

Doubtless a great many physicians are like Dr. Niemeyer. They not only will admit that deep breathing is

the right and natural method for every person, but also will suppose that every one can employ it as easily as themselves. But this is an entirely wrong conclusion. I have met many persons, particularly those advanced in years, who breathed deep instinctively, but who could not do it voluntarily before they were taught. Among such was a physician of forty-five years' practice, who did not breathe deep, and who believed that he could not on account of pleurisy. His surprise was great when he, after short instruction, could take twenty to thirty long consecutive inspirations without discomfort. "It is indeed a new system," he exclaimed.

What wonder!

If our contemporary physiologists had read of a method of voluntary, full respiration other than Valentin's laborious expansion of the ribs (which they could suppose possible only for vigorous persons), if they had known and practiced voluntary, active deep breathing, they never would have withheld it from suffering humanity; they never would have allowed the present generation, blessed with so much knowledge and so proud of its intellectual development, to remain ignorant of and unable to use at will the most important natural function in the human body. They would have spared the people of the present day, with all their attainments, the necessity of learning the ridiculous, if it were not so melancholy a fact, that a large part of their power had been unutilized in consequence of a sin of omission committed through ignorance. Deep breathing and retention of air would long ago have been introduced in all schools as an obligatory daily practice; lung-gymnastics would be known not only in name but in deed, by their beneficial effects; and attempts to show the necessity of respiratory exercises would not prove fruitless with so large a number of medical men. Thousands of

invalids, especially consumptives, to whom long inspirations of good air were prescribed as the first remedy, would not torture themselves with straining movements of their respiratory organs, already suffering, and finally stop trying in the belief that they could not breathe deep any more, that they were too weak, too sick, and that their lungs would no longer endure it.

This is an error, a general, predominating, ruinous error.

There is no easier, healthier and more quieting movement for the human body to make than that required for deep breathing. I have taught it to children ten years old, and to persons seventy or eighty years of age, to sick and well, to those afflicted with heart or lung-disease, even to those in the last stages of consumption,—and all have invariably expressed delight and satisfaction at this simple and salutary exercise which, when rightly learned, can be practiced ten, twenty or fifty times without injuring or fatiguing the chest. The invalid confined to chair or bed, as well as a person in good health, can breathe deep hundreds of times a day, thereby greatly invigorating his entire body.

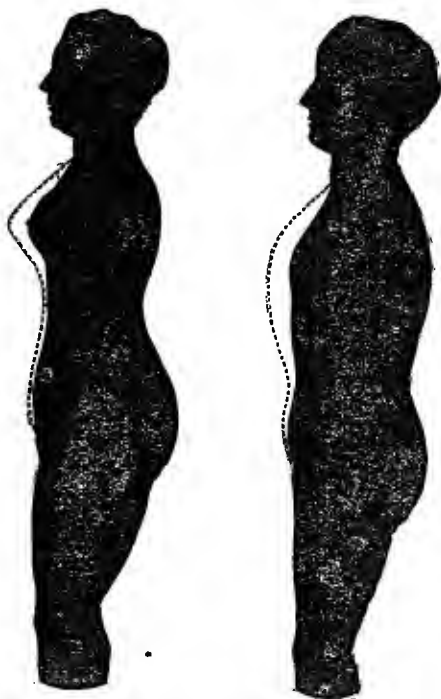
I now proceed to show how natural deep breathing can be learned, illustrating by means of cuts. In doing this I follow the example of Dr. Renzone, of Naples, who, in 1879, published a work entitled, *Manuale di Fisiologia Umana*. Figures I. and II. are taken from this book. They represent the type of voluntary inhalation heretofore known in physiology, and which, as has been taught, is different in men and women.

Figures III. and IV. illustrate the mode of deep inhalation discovered by me, which is the same for both sexes, and which only in sudden forcing of the air into the upper parts of the lungs, or in very powerful exhalation,



causes an expansion of the thorax, as indicated by Figures V. and VI.

To learn deep breathing, be as passive as possible; that is, assume a position in which all the voluntary motor



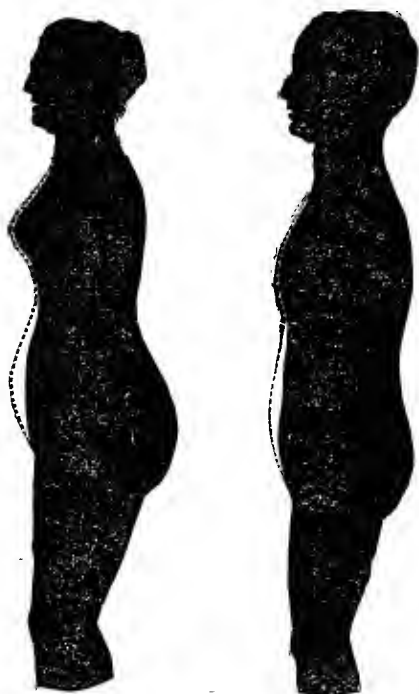
FIGS. I., II. VOLUNTARY RIB-BREATHING.

muscles are inactive. Lie flat on the back, perfectly horizontal, without even an elevation of the head.

Shut the mouth and draw the air in through the channel provided by nature—the *nose*.

As a result of bad habits, most persons will raise the

upper ribs, yet this expansion will soon yield to a movement of the lower ribs, and this again will gradually cease by continued practice, as will also every distention of the ribs. All these faulty movements will be super-



FIGS. III., IV. VOLUNTARY DEEP INHALATION.

sed by a bulging out of the abdomen, whose outward swelling will be proportioned to the amount of air inhaled (Figs. III., IV.). In forcible exhalation the abdomen is drawn in and the chest is pushed out, as shown in Figures V. and VI.

This rising and sinking of the abdomen as an involuntary manifestation of quiet breathing (in sleep, for instance), and the effect of coughing and sneezing, are known to physiologists, who will easily understand that these movements can be made *voluntary* without fatiguing the chest, for in deep inhalation the *diaphragm alone* seems to be active, and in forcible displacement of the air toward the middle and upper parts of the breast, or in exhalation, our *principal expiratory* muscles—the abdominal,—with the greatest consideration for the many and weaker respiratory muscles of the thorax, do nearly all the work !

The importance of the abdominal muscles, their co-operation in ordinary respiration, has been recognized by Haller, who calls attention to the fact that they not only work upon the ribs, but also promote expiration, by pressing the viscera against the diaphragm. Although no one has clearly mentioned their voluntary participation in inhalation, yet I feel confident in asserting that, without the voluntary expansion or relaxation of the abdominal muscles, a deep inhalation is impossible, as is likewise a powerful exhalation without their voluntary contraction. It may, therefore, be concluded that in the voluntary, alternate expansion and contraction of the abdomen is the key to understanding and carrying out deep breathing, which alone furnishes the basis for a correct system of lung-gymnastics.

Is it necessary to add that deep abdominal breathing produces an effect entirely different from that of rib-breathing ; that in the deepest possible breathing the chest is lengthened downward, without a sideward expansion of the ribs ; that in strong exhalation and in changing the air to, or holding it in, the upper chest, it (chest) is enlarged, thereby artificially increasing the size

of the thorax, but without the deleterious consequences ascribed by Dr. Neumann to rib-breathing ?

Men and children have no trouble in learning deep breathing, which is also soon mastered by women, if they have not sinned too grievously against the laws of their being. Such women, however, married or single, as are victims to false training and senseless custom, will require more time and effort to restore their respiratory function to its normal condition. Still, in a supine position, as already described, deep breathing is easily acquired, and by practice it can soon be carried out in any posture of the body.

What else is this but the *natural* breathing of every person, heretofore neglected or unknown because of our tendency, whenever we attempt something natural, to always begin with the artificial, and thus are led off and lose sight of nature's laws ? This is proved by the fact that for many centuries only the enlargement of the thorax was described and advised, and by the truth of the assertion that the attainment of the highest art is simply a return to nature, in the realization of which many, indeed, may be called but only few are chosen.

Such a deplorable state of the art of song and of respiration will cease to exist whenever the secret—small, yet of the greatest importance—which I now reveal is utilized for effecting a return to the *natural*, upon which all true art must be based.

The height of the art of breathing—which is also conducive to the best physical health—may be attained by holding the air a long time, by pressing it from the lower to the middle and to the upper part of the breast, and *vice versa* ; by practicing until the lungs are strengthened and a pointed or high breath (*Spitz oder Hochath-*

*men*) is as easy as costal and abdominal breathing, and until *ten* as well as *twenty* complete respirations may be taken per minute without the slightest fatigue to the chest.

Invalids, especially consumptives, should not attempt this perfection in the art of breathing. To derive benefit from it they should be content with gentle flowing in and out of the air, alternating with short retentions of the breath.

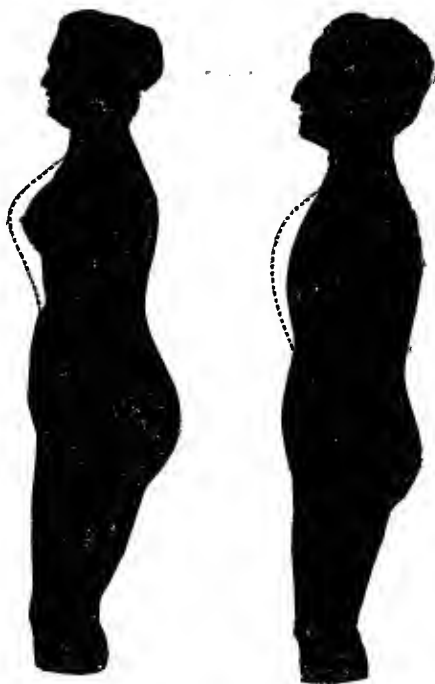
*By no means join deep breathing with other bodily movements.* Dr. Neumann says that "the motor muscles are antagonistic to those of inhalation and exhalation." When we, as in walking, contract the abdominal muscles for the locomotion of the whole body, we should not strive to force them into the relaxation necessary for deep breathing.

I advise the pupil of singing to *always breathe through the nose*; and, during the hour devoted exclusively to practice, to take a *sitting* or even a *backward reclining* position. This is the secret employed by the Italian masters to develop deep breathing in their pupils, and it is certainly most effectual, for in this position the various muscles which can impede respiration are passive.

The Italian school of singing is represented (even if sparingly) in Germany. In the schools of Stockhausen, Dr. Gunz, Cav. Lamperti and others, there are unmistakable traces of a thorough method of deep breathing, as evidenced in Patti, Trebelli, Nilsson, Alboni, Cruvelli, Faure, etc. Emil Brüde, actor at the Royal Theatre and teacher of dramatic art in the Conservatory, Dresden, does his utmost to develop deep breathing in his pupils and spare them from the terrible gasping breaths which characterize so many talented actors and singers, who by straining their shoulders and involving their arms in

their respiratory struggles, not seldom awaken more pity than admiration in the astonished audience.

That these melancholy manifestations may disappear



FIGS. V., VI. POWERFUL, VOLUNTARY DEEP EXHALATION.

through the knowledge, the spread and the proper estimation of deep breathing, is my earnest wish. I warmly recommend respiratory gymnastics, by themselves and without tone, to singers and actors.

An excellent way to apply deep breathing to singing, reading and speaking is to first breathe in with closed

mouth and then pronounce repeatedly a few syllables loudly, as,—

- (1) **ah, bah, kah, dah,**
- (2) **fay, gay, hay, he,**
- (3) **ye, ke, le, me, ne, etc., etc.**

By paying close attention to the articulation of the consonants and to placing the syllables in front, *i.e.*, on the lips, a double purpose will be served. These exercises should first be practiced while lying flat on the back, subsequently while standing, sitting, and, in fact, in crooked and bent attitudes. By pursuing this course deep inhalation and exhalation will soon become an established habit; the voice will have a true air-column to rest upon and will gain a vibratory power never before possessed.

We must have artists and we must pay artists. Unfetter art, that she may no longer grant golden wings to only a few lucky birds! By producing a greater number of good artists, is the only way to accomplish this.

In confirmation of what has been said in regard to the influence of deep breathing upon combating and curing consumption, I refer to the works already mentioned, and to the writings of other scientists. I should like to close this treatise by adding the entire book of Dr. Fr. Bicking, entitled “Respiratory Gymnastics for the Cure of Various Diseases, Especially Consumption,” which is a most interesting, valuable and learned work; but, unfortunately, I can only refer the reader to it, as a melancholy verification of my statement, that only in the recognition, the learning and the daily practice of deep breathing in schools, hospitals, etc., will teachers and physicians have the means to free humanity from the evils of indolence, vanity and bad habits.

I agree with Zoé von Reuss, who says :— “ A powerful and reliable element would thereby be introduced in education which would compel a due realization of the necessity of constant intercourse with nature, in a continual and copious replenishing of air, which is the true vitalizer of the blood. A person thus trained would not be able to dispense with the comfort and satisfaction afforded by deep breathing.”

This element would likewise induce women of tight-lacing propensities to ventilate their lungs well, at least a few times every day—as Dr. Niemeyer repeatedly recommends ; while it would teach all to know and prize the best gift of nature and to enjoy it *out of a full breast*.

That it is really not the fault of physicians that we have not and do not avail ourselves of the benefits of deep breathing, is shown by the works already referred to. From 1872, Dr. Bicking has told us that respiratory gymnastics are the only effectual remedy for pulmonary affections, and especially for that terrible, most frequent and devastating one—consumption. Dr. Niemeyer, of Leipzig, Dr. Stein, of Frankfort, Dr. Dornblüth, of Rostock—and who knows how many more ?—repeated the same conviction several years afterward ; but, in spite of all, breathing exercises remain unknown, save by name, to this day ; they have been introduced in no school, are taught by scarcely any one, are practiced by few, and, as centuries ago, are praised sky-high in *theory*, while in *practice* they are withheld from men on earth.

Let us close these unpleasant reflections by quoting the celebrated words of a pious and learned Pope, *non andra sempre così*, in the sincere wish,—*May it not always be so !*

The work of Dr. Renzone, already referred to, leads us to hope for the dawning of a better era. This is the only



book I know of that gives a complete description of a deep *exhalation* in which *the ribs remain perfectly motionless*.

The question arises, if any book other than mine gives a mode of *complete* respiration in which *the ribs remain perfectly motionless*. It may be, but I am not acquainted with such a work. Whatever may be the fact, my earnest and unceasing prayer is, that out of pity for the many invalids, out of love to all humanity, yes out of love for the beautiful and salutary art of song, every person may learn and practice

### DEEP BREATHING.



## APPENDIX I.

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### INTERESTING FACTS CONCERNING THE AIR—VENTILATION, DRAUGHTS, ETC.

THE atmosphere is composed of oxygen and nitrogen in the following proportion (by weight):

Oxygen, 20.96 parts in 100.

Nitrogen, 79.04 “ “

By measure,

Oxygen, 23 parts.

Nitrogen, 74 “

There exists also from one-third to one-half of one per cent. of carbonic acid, a trace of ammonia, and the spectroscope reveals a little chloride of sodium. The amount of this latter is so small the chemist cannot detect it. A quantity of ozone is present, in varying amounts according to the location and time of day.

The oxygen serves as a food for men and animals. The carbonic acid, ammonia, and nitrogen serve as food for plants.

The ozone is one of the disinfectants or purifiers of the air.

The chloride of sodium probably serves as a tonic for man, and also as a food for plants. There is most of it in the air near the sea-shore.

There is a varying amount of moisture, which is requisite to both the animal and vegetable world.

We need air constantly, both to nourish us and to keep us cool.

Every breath we inhale carries into the body a certain amount of oxygen.

Every breath we exhale carries off a certain amount of animal heat, carbonic acid, vapor, and traces of other substances.

Every adult requires daily about 360 cubic feet of pure fresh air.

This equals 2,000 gallons for one day, and 730,000 gallons for one year.

The 2,000 gallons of air required daily weigh 25 pounds.

A human being, then, requires by weight three times as much air as he does of food and drink combined. About eight and one-half pounds of the latter are considered sufficient daily for a hard-working man.

The air is 770 times lighter than water at the sea-level, but as we ascend it becomes constantly lighter.

The height of the atmosphere is not known. Some have estimated it to be forty-five miles, but others think it not less than two hundred miles high.

In the open country, in the forest, and by the sea-side, the air is purest, and the oxygen and ozone most abundant.

The vegetable world takes up the carbonic acid of the air for food and gives back oxygen—a process exactly the reverse of what animals do.

In the crowded parts of a city there is less oxygen than in open spaces. A very small decrease in this substance in the air seriously affects the health. A man would die at once in an air containing only 18 parts of oxygen.

The weight of the air pressing on a human being of

average size amounts to about 14 tons, or 15 pounds to the square inch.

There are tides in the air like those in the ocean, and they occur with the same regularity.

The impurities of the air are numerous, but we do not call the small amounts of carbonic acid, ammonia, and other substances which exist in the open air, impurities. It is only when they are present to an extent injurious to health that they become so.

The impurities of the air are of two kinds—gaseous and solid.

The gaseous impurities are carbonic acid, carbonic oxide, ammonia, and such other substances as result from animal and vegetable decay. There also arises from factories filthy soil and water, and other poisonous gases too numerous to mention.

The solid impurities are smoke, dust, dirt, the pollen of flowers, minute particles of wood, cotton, silk, epithelial scales from the body, tobacco fumes, particles of minerals arising from copper, steel, iron in factories, smut from diseased plants, pus corpuscles from wounds, and various other substances.

The germs of disease or bacteria are also solid impurities of an organized vegetable nature, so minute they cannot be seen. These produce small-pox, diphtheria, measles, whooping-cough, malarial fevers, etc. There are also bacteria which are harmless, as well as dangerous ones.

We measure the gaseous impurities of the air by the amount of carbonic acid it contains. If there is much of this, other gases are also generally present, and *vice versa*.

Nature's method of purifying the air is by rain, wind, sunshine; by plants taking up the carbonic acid and re-

turning oxygen, and by the formation of ozone, which has the power of burning up or decomposing some of its dangerous elements.

Certain trees and plants give off volatile odors and vapors, which help to purify the air and render it both fragrant and wholesome. The pine-tree exhalations are conspicuous examples.

Ventilation is the art of removing from our dwellings the products of respiration, cutaneous exhalation, the combustion of fires and lights, and the effluvia from the sick-room, the vapors from the kitchen, etc., by a stream of pure air.

The amount of air required to ventilate a room depends on its size, the number of persons in it, and the standard of purity we wish to maintain.

There are two standards of purity for house air. One is the English standard, which requires that the carbonic acid in it shall not be more than 0.6 parts in 1,000 of air. The other standard is that set up by Pettenkofer, the German hygienist, which allows 1 part of carbonic acid to 1,000 of air. Out-door air has 0.3 or 0.4 parts per thousand.

To maintain the English standard of purity requires not far from 3,000 cubic feet of fresh air per hour to each individual. To maintain the German standard requires 2,100 cubic feet for each occupant per hour.

To get so much fresh air into a room without a draught is easy enough where only a few persons are present. It often becomes a serious matter where a large number are congregated in a small space.

Draughts are believed to be dangerous. We can endure a million gallons of air hourly during a high wind if it is not too cold, and we are out of doors at work ; but

the strongest man cannot endure 1,000 gallons an hour of cold air blowing on him when sitting still. When we are quiet we want the air quiet, too.

A draught is a current of air moving at a rate perceptible to our senses, and blown only on one part of the body. At a temperature of 60 degrees, when the air moves at the rate of  $1\frac{1}{2}$  feet per second, it is not perceived by the most delicate person. At 2 feet per second, a few sensitive ones notice it. At 3 feet per second, the movement is barely perceptible by almost all, and at  $3\frac{1}{2}$  feet by all. If the air is colder than 60 degrees, a slower movement is felt.

The secret, then, of good ventilation, is to supply 3,000 feet of pure air per hour to each individual. The sick need more than this. In the best hospitals 6,000 feet are allowed, and even this has been found insufficient. The nearer the air is to the pure out-door air for the sick, the more rapidly will they recover.

In mines it has been found that the workmen do more labor when 7,000 feet of fresh air are supplied to them hourly. If less than 6,000 are allowed, they become languid and incapable of great exertion. The same is true in factories, and it is bad economy to supply less.

Air once inhaled is unfit to be breathed again until subjected to the purifying influences of nature.

Our senses should be kept in such a healthy condition that they will instantly detect impure air, and thus warn us of the danger we are in.

It requires only a few minutes for five hundred people in a church, lecture-room, school, theatre, or other places where they may be congregated, to render the air therein unfit for the purposes of respiration.

Our methods of dress interfere with the deep inhalation of air, and thus diminish our life force. A tightly

fitting dress diminishes the amount of air inspired about one-third.

A man expires daily about 16 cubic feet of carbonic acid.

Two sperm candles give off the same amount.

A good lamp gives off a cubic foot of carbonic acid gas in two hours, or nearly as much as a man.

In a crowded theatre, with two or three thousand people and several hundred gas-burners, the air becomes frightfully bad, and may contain three or four times as much carbonic acid in it, besides the exhalations of the skin, as is compatible with health. The injury done to the persons who inhale this vile mixture is very great, and sometimes indirectly results in death.

When we are out of doors, and the wind is blowing at the rate of 7 miles per hour, not far from 324,000 cubic feet of air flow over us hourly.

Children are greatly injured by being brought up indoors and in bad air. They lose their appetites, do not grow so large and strong, and never make healthy men and women.

It is a great misfortune to be obliged to spend most of our time within the house, where the air cannot be kept absolutely pure.

The most important prescription for the cure of ordinary nervousness is an ample supply of pure, fresh and cool air. The nerves will always be weak if the greater part of the day and night be passed in close, ill-ventilated and over-heated apartments. The nerves, to be properly nourished, require a full supply of oxygen. They will not endure vitiated air, whether the impurities come from sewers, gaslights, subterranean furnaces, or the individual's own person, without making an energetic protest. A gas-burner consuming four cubic feet an hour produces



more carbonic acid in a given time than is evolved from the respiration of eight human beings. Bear this in mind, you who suffer from nervousness, that when you have shut yourselves up in your rooms and lighted an argand burner, you are to all intents and purposes immured with twenty-three other persons, all taking oxygen from the atmosphere. Is it a wonder that after several hours' exposure to the depraved air your nerves rebel, as far as their weak state permits, and that your head aches, your hand trembles, and that your daughter's playing on the piano almost drives you wild?

Many object to sitting near a wall because they say there is a draught there; but generally it is only a one-sided radiation of the heat of the body toward the cold wall. We should be able to distinguish between a draught and radiation.

A draught is injurious, because it causes a perturbation of the heat economy of the body, but chiefly because it disorders the action of those nerves which exist in the form of a net-work around the blood-vessels, and which regulate their diameter, and consequently the flow of blood and the regulation of the heat of the body are changed from normal to abnormal, and a cold results.

In our public schools the allowance of fresh air per hour for each pupil in winter ranges from 400 to 1,000 cubic feet per hour. It ought to be 3,000 feet per hour.

Children deprived of a full supply of air at school soon become uneasy, restless, and cease to learn. Their power of attention becomes weakened, their memory is debilitated. They cannot remember their lessons, and make no progress. Give them pure air, and all is changed. Study becomes a delight, and the attainment of knowledge is very rapid. A child will learn more in one hour in a pure air than in six in an impure one. Every thirty minutes during cold

weather a school-room should be thrown open, and the out-of-door air allowed to sweep through it for at least five minutes. During this time the pupils may practice light gymnastic exercises or sing songs—the draught will do them no harm when they are exercising vigorously.

Mothers, who are the queens of our homes, should master the subject of air and ventilation, and put all their acquirements into practical use. They should read every new health book that appears before they touch a new novel, cookery book or fashion journal.

Washington Irving once said, “I am convinced that he who devotes two hours each day to vigorous exercises out of doors in the pure air, breathing in deep copious draughts of it with every breath, will eventually gain those two hours, and a couple more into the bargain.”

A few dollars spent for books, and a few hours of careful reading, would educate every man, woman and child. as to the use and value of fresh air, the need of ventilation and the best method of accomplishing it. It would prove a most profitable investment.

## APPENDIX II.

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### CLASS IN LUNG GYMNASTICS.

“ALLOW me to express the great pleasure the article on ‘Deep Breathing as a Means of Health’ gave us, and also allow me to explain that on the 27th day of last October assembled what we styled our ‘Breathing Class,’ at the Hygiene Home, for the first time. We shall (since reading ‘Deep Breathing’) style ourselves ‘Class in Lung Gymnastics.’ Please imagine us, then, out on the sunny side of our porch, enveloped in warm wraps, with soapstones at our feet, lying upon stretchers, inhaling the life-giving oxygen for hours each day since the above date, thus purifying our blood with the greatest blood purifier—oxygen !

“It is true, we have had a very few rainy and snowy days, but the porch is broad, and not a morning dawned but that at least a single row of stretchers has been placed close up to the building, and at the ringing of the bell occupants have appeared promptly, and for hours practised lung gymnastics, alternating with short naps, quiet rest, pleasant conversations, and sometimes listening to readings ; and I am assured the physical gain to our patients has surpassed my most sanguine expectations. I have been surprised at the interest they have put into this treatment, not more than at their rapid re-

turn to health, strength, better blood, increased depths of chests, and restoration of displaced viscera. At the beginning I noted down measurements. I rejoice that I did so ; otherwise the results would have appeared incredible. In the case of a young lady, one of our most earnest and faithful breathers, a dress which she wore with entire comfort before the lung gymnastics, was, on the 24th of December, tried on, and would not meet within three and a half inches, and upon expansion of the lungs to their fullest, she needed six inches more dress. We all knew her cheeks had grown rosy, her eyes bright, and her walking powers increased, but we were not prepared for the realization of what nature could effect for one who obeys implicitly and persistently her benign behests. Hoping others may be induced to try lung gymnastics, I remain,

“Yours for the good of humanity,

“HARRIET H. H. LARKIN, M.D.”

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